WIPP Update

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South Carolina Governor's Nuclear Advisory Council
Columbia, South Carolina
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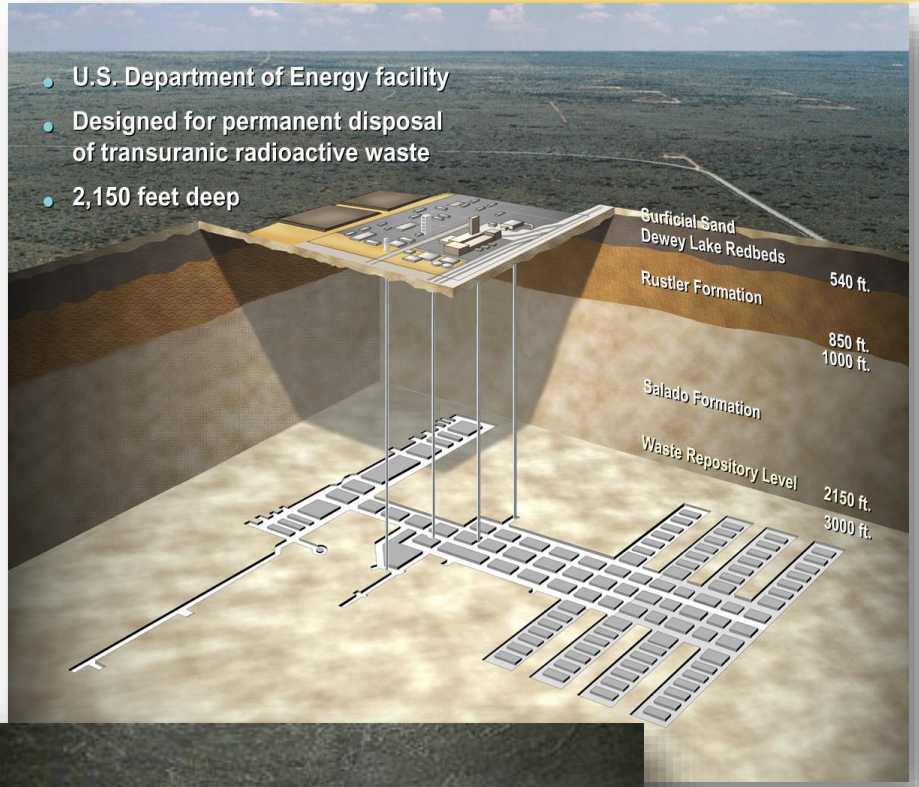
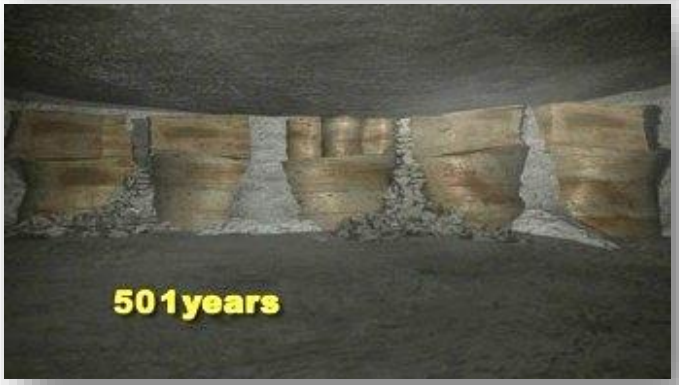
WIPP Update

- **WIPP Background**
  - Location and geology
  - Transportation system
  - 2014 fire and radiological release events
  - Key steps to recovery
  - Recovery Challenges
- **WIPP Future - Near-Term (next 12 months)**
  - WIPP reopening
  - Waste emplacement operations in Panel 7
  - Resumption of shipping – establishing priorities
  - Supplemental Ventilation
  - Restart of mining operations
  - Mining and waste emplacement model
  - Withdrawal from far south end of the WIPP underground
- **WIPP Future - Long-Term (1 to 5 years)**
  - New - air intake shaft
  - New safety significant permanent ventilation system
  - Conceptual model for additional disposal area

WIPP Geology

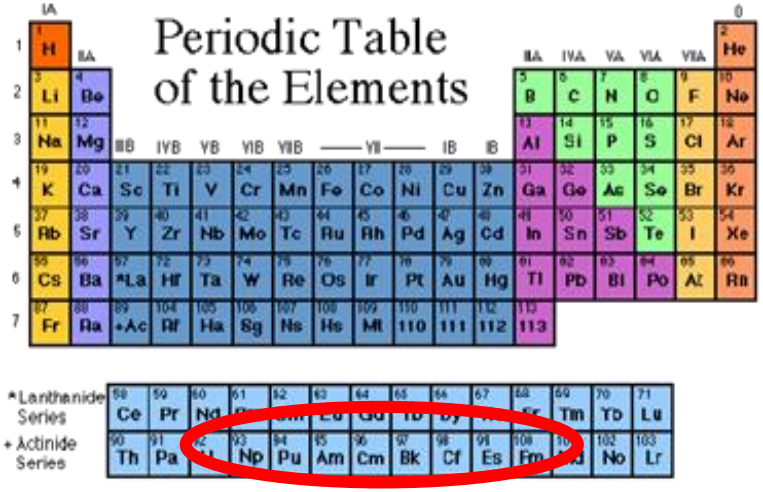
Facility mined in salt:
2,150 feet deep in ancient salt formation that closes in and entombs waste forever





Disposal of "TRU" Waste at WIPP

- Materials contaminated with man-made radioactive elements heavier than uranium (mostly Plutonium)
  - Clothing, tools, rags, containers, etc.
  - Soils and debris
  - Homogeneous solids, residues
- > 100 nCi/g (~1ppm):
  - alpha emitting isotopes
  - t½ > 20 years
- Two types of TRU waste
  - Contact-Handled (<200 mrem/hr)
  - Remote-Handled (>200 mrem/hr)
- Legacy inventory ~700,000 drum equivalents



TRU Waste Characterization

Process to determine the physical, chemical and radiological contents of TRU waste containers to ensure that waste is acceptable for disposal at WIPP

Use documented waste stream knowledge to identify waste contents

Look for prohibited items, such as aerosol cans or liquids

Determine radiological contents

Determine volatile organic compound contents

Performed on samples of homogeneous waste to analyze for chemical hazards

WIPP Transportation System

NRC certified Type B containers:

TRUPACT II

TRUPACT III

RH-72B

WIPP Transportation System

22 sites completed
11,800 shipments thru Feb. 2014
14 million loaded miles

WIPP Transportation System

Waste containers are loaded into protective shipping containers (such as TRUPACT-II)

Shipping containers are loaded onto specially designed flatbed trailers. State personnel inspect load before departure

Drivers inspect their rigs and loads every 3 hours or 150 miles. Some states require additional inspections at their ports of entry

For safety and security reasons, shipments are tracked throughout their journey using a satellite system (TRANSCOM)

WIPP-trained state and local emergency responders along all shipping routes, with frequent exercises

WIPP Regulatory Framework

U.S. Environmental Protection Agency (EPA)

Repository certification, radionuclide regulation, PCBs

New Mexico Environment Department (NMED)

RCRA hazardous constituents, water discharge, groundwater, air

U.S. Nuclear Regulatory Commission (NRC)

Transportation Type B packages for nuclear materials

Mine and Occupational Safety and Health Administrations

MSHA Mine Safety & Health Administration

OSHA Worker Safety and Health

U.S. Department of Transportation (DOT)

Highway transportation, Type A containers

The February 2014 Accidents at WIPP

WIPP incidents

February 5, 2014 Truck Fire:

- All operations at the repository ceased following salt haul truck fire in the WIPP underground.
- An investigation team was deployed to determine the cause of the fire.

February 14, 2014 Radiological Incident:

- A continuous air monitor detected airborne radiation in the underground.
- WIPP's ventilation system automatically switched to high-efficiency particulate air (HEPA) filtration mode when airborne radiation was detected
- Underground and the WIPP mine remains in filtration mode at this time.
- Extensive sampling and monitoring conducted by DOE, New Mexico, and Carlsbad Environmental Monitoring Research Center
- Efforts by the DOE and Nuclear Waste Partnership are ensuring workers are fully protected during recovery and restart.

Truck Fire and Radiological Release

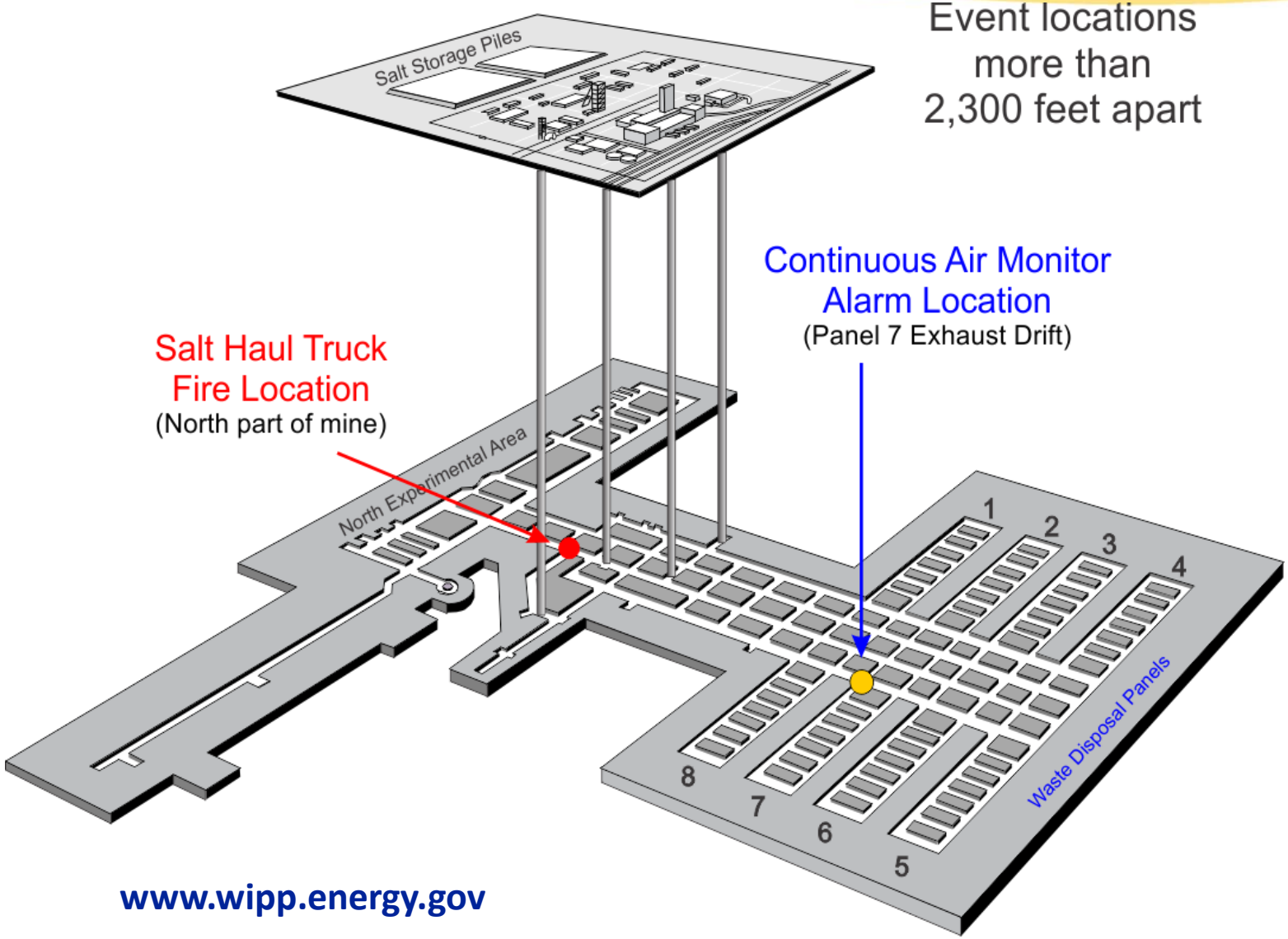
February 5 Underground Fire

Accident Investigation Board (AIB) Report issued March 13, 2014

February 14 Radiological Release

- AIB Report, Phase I issued April 24, 2014
- AIB Report, Phase II issued April 16, 2015

Recap of Incidents: Layout of the Underground



www.wipp.energy.gov

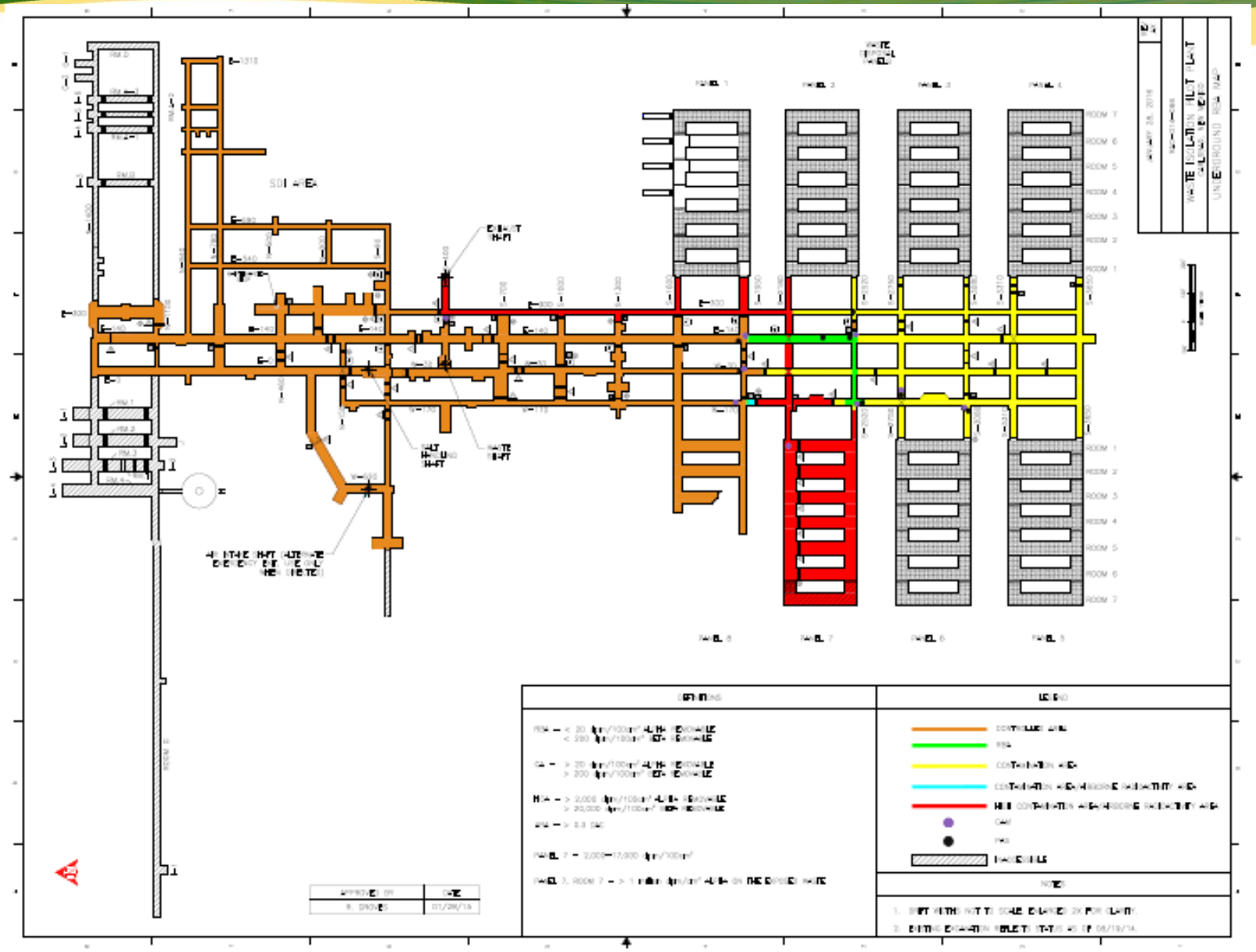
Key Steps Toward Recovery

- Documented Safety Analysis Revisions
- Safety Management Program Revitalization
- Underground Restoration
  - Re-Establish Degraded Equipment
  - Fire Protection
  - Maintenance and Ground Control
  - Radiological Roll-back
  - Soot cleaning of electrical panels
- Expedite mine stability
- Initial Panel 6 and Panel 7, Room 7 Closure
- Interim Ventilation

Key Steps Toward Recovery

- Initial Panel 6 and Panel 7, Room 7 Closure – isolation of nitrate salt waste
- Procurement and installation of Interim Ventilation System

Radiological Conditions

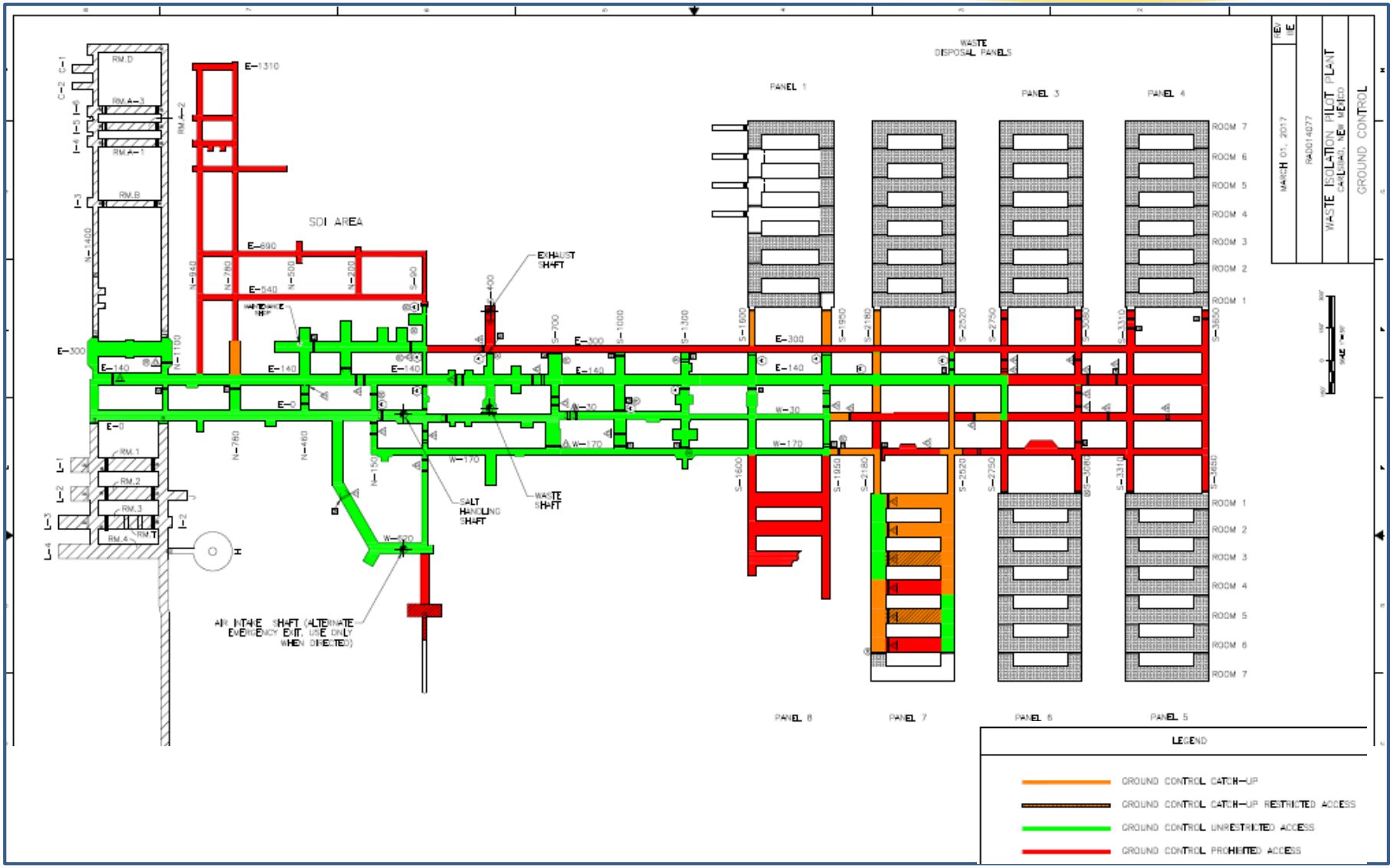


Ground Control Challenges

Limitations:

- 9 – months with no ground control following incidents
- Low ventilation rates limited bolting operations
- Need for workers to operate in personal protective clothing and respirators

Ground Control Status



Reopening and Resumption of Shipments

Reopening

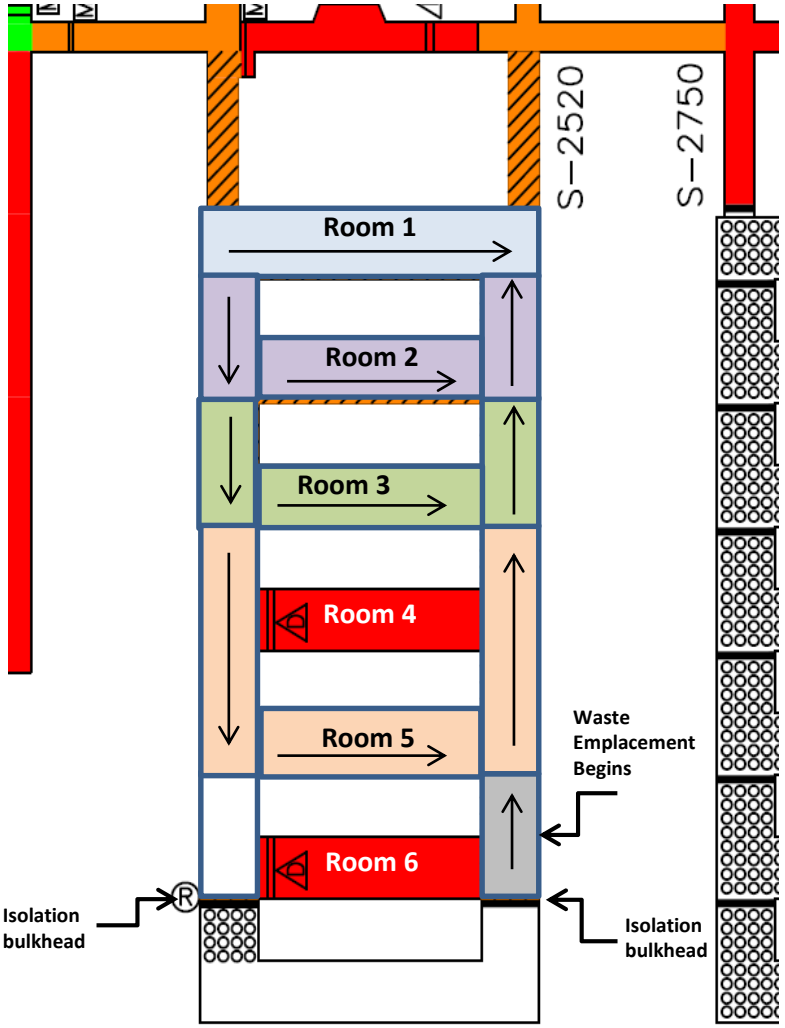
WIPP Officially Reopened with a ribbon cutting ceremony held on January 9, 2017

Waste Emplacement Resumes

- Waste emplacement operations resumed in Panel 7 – transition point between clean and contaminated area is necessary
- Most of the stranded waste from the Waste Handling Building has been emplaced – remaining waste streams need further evaluation for oxidizers

Panel 7 Status

- Bulkhead were placed at both ends of Room 7 to isolate waste following events – remains closed
- Rock fall occurred in Room 4 on November 3, 2016 – fall was predicted and room was already prohibited
- Room 6 is prohibited due to ground control – also contains abandoned equipment
- Rooms 1, 2, 3 and 5 are safe and usable for waste emplacement
- Waste emplacement has started in S2520 moving west to east
- Currently available disposal capacity in Panel 7 should last approximately 3 years, depending on shipping rates



Timing and Origin

Shipments resumed earlier this month –

- First shipment was received from Idaho on April 8
- Shipment rate of 2/week – ramping up to 4/week by the end of 2017
- WIPP anticipates receipt of approximately 128 shipments between April of 2017 and the end of January 2018
- First group of shipments is expected to be from Idaho and Savannah River and Waste Control Specialists – not necessarily in that order
- Additional shipments are expected from Los Alamos National Lab and Oak Ridge National Lab later in 2017

Projected Shipping Estimates

Key considerations in the development of the shipping estimate and points of origin included:

- WIPP waste emplacement rate;
- Available waste to ship;
- Regulatory commitments and agreements;
- WIPP transportation/waste acceptance capabilities;
- Flexibility for changing technical and policy constraints.

Site	Projected Shipments
Idaho	61
Los Alamos	24
Oak Ridge	24
Savannah River	8
Waste Control Specialists	11
TOTAL	128

Factors Affecting Shipping Priorities

Shipping priorities are based on many factors, including:

- Need to mix of waste streams from around the complex to avoid concentration of VOC generating waste in one location
- Need to mix waste types to manage curie limits for the Waste Handling Building during processing
- Need to receive packages that can be stacked in a manner that maximizes use of limited disposal area

Supplemental Ventilation/De-dusters

Supplemental Ventilation System (SVS) will add 70 KCFM to underground to support mining operations – on line in late September

Use of new “de-dusting” technology should reduce impacts of salt dust on air filtration systems

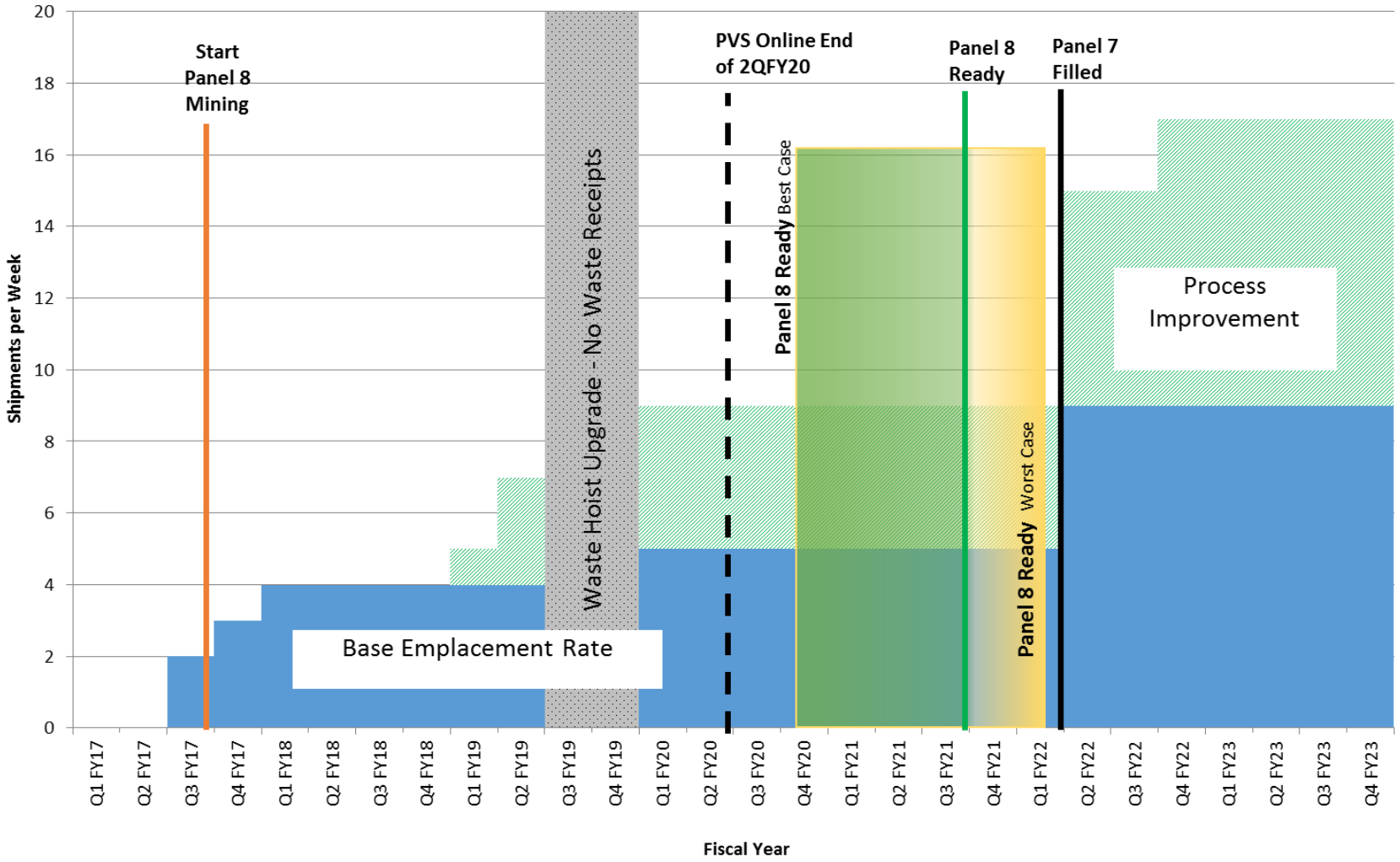
Mining Panel 8 Will Resume

Mining of Panel 8:

- Planned to begin in October 2018
- No contamination present
- Required to bolt our way into the panel to remove equipment that has remained there since events
- Mining operations are expected to take approximately 3 years

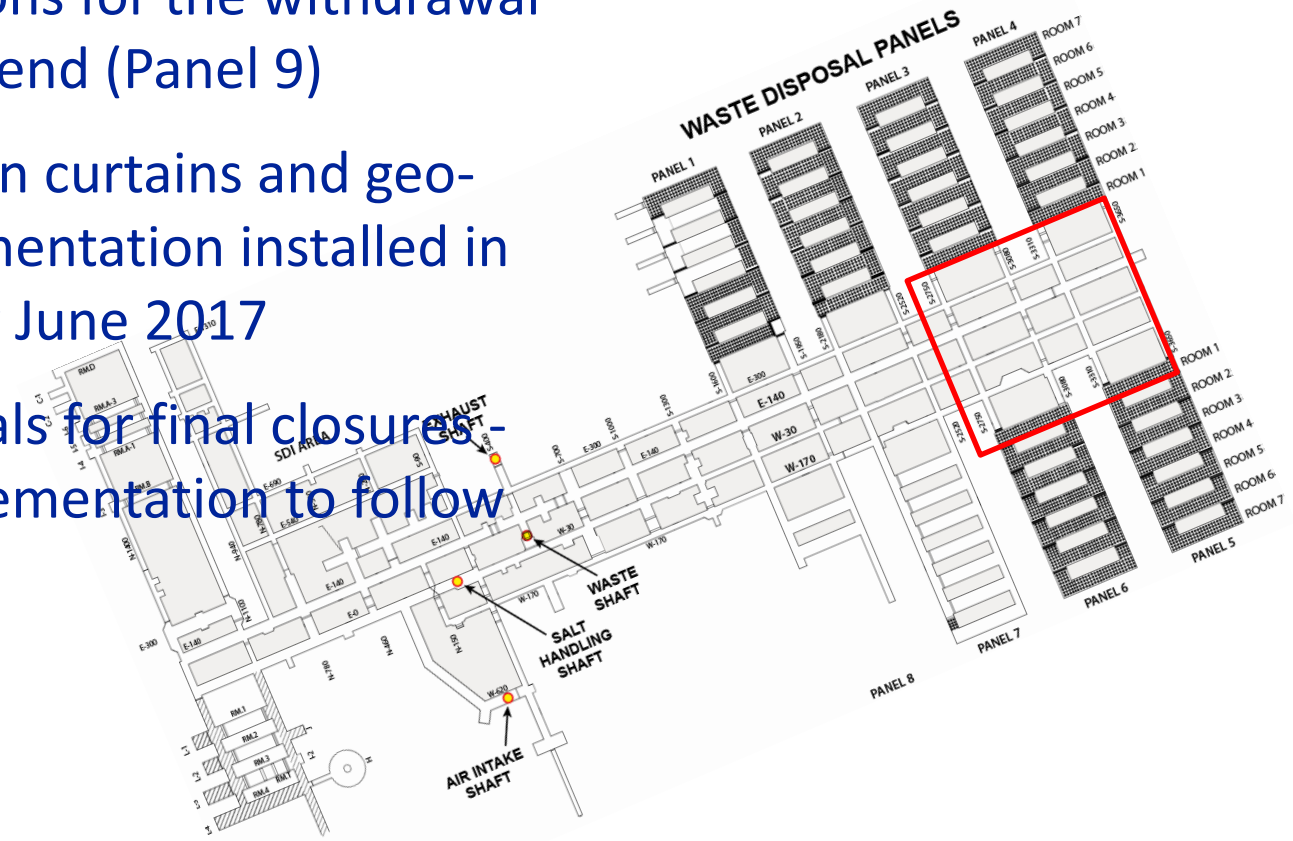
WIPP Mining and Waste Emplacement Model

Waste Emplacement Rates FY17 - FY23



Far South End Closure Progress

- Initiated preparations for the withdrawal from the far south end (Panel 9)
- Cribbing, ventilation curtains and geo-mechanical instrumentation installed in the south mains by June 2017
- Regulatory approvals for final closures - 2+ years with implementation to follow

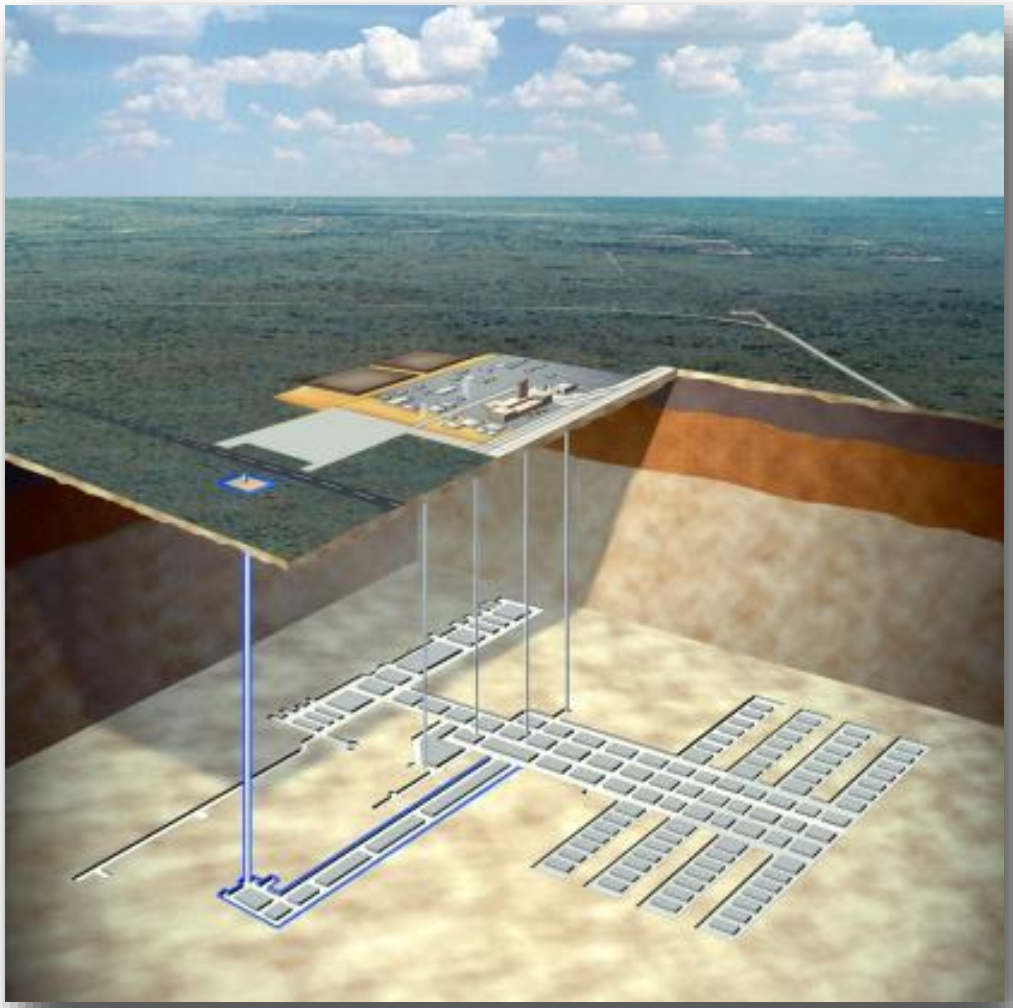


New Ventilation Shaft

- Using top-down drilling method
- Located across the access road from the WIPP parking lot
- Geotechnical core drilling to 2,300 feet is complete
- Critical Decision 2/3 expected in March 2018
- CD 4 expected in December 2020

Depiction of New Footprint

- **New footprint is being evaluated with the following criteria:**
  - ✓ Priority will be to create panels to compensate for authorized disposal area that was reduced by ground control issues in the far south end
  - ✓ Panels and drifts construction is under review
  - ✓ Panels will be mined with existing equipment and methods

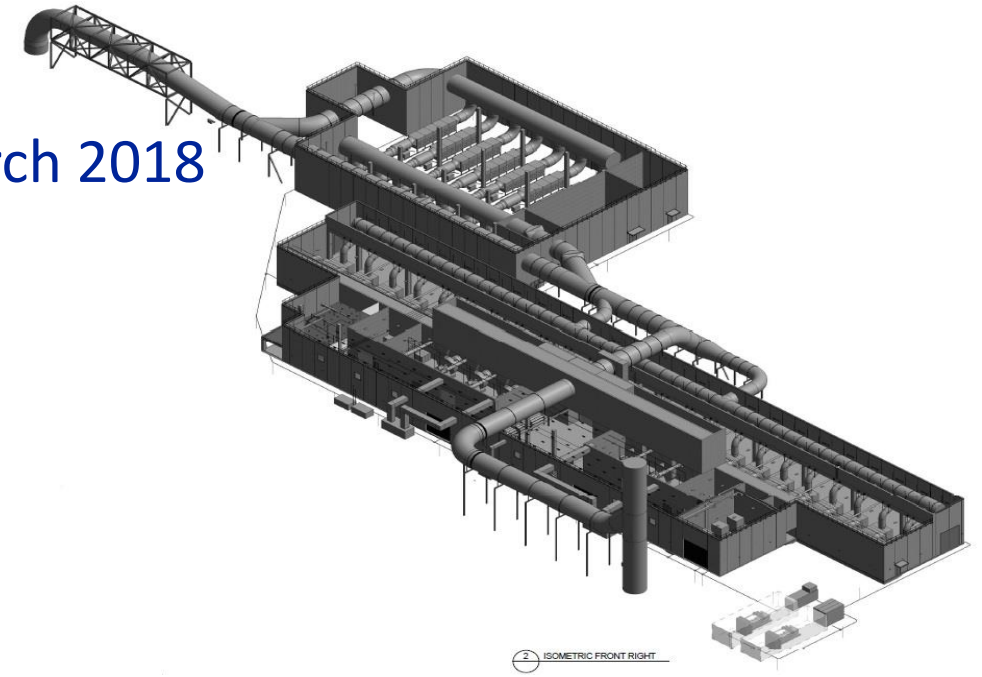


Permanent Ventilation System

New filter building

New safety significant confinement system connected to the existing exhaust shaft through a salt reduction facility and then to a new Filter Building with HEPA filters and exhaust fans -

- Currently at 90% design
- CD 2/3 is expected in March 2018
- CD 4 December 2020



Questions
&
Answers





WIPP Underground Map